

[54] **INSTRUMENT SURGICAL WITH SUCTION DEVICE**

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Related U.S. Application Data

[63] Continuation of Ser. No. 156,825, June 25, 1971, abandoned.

[52] U.S. Cl. **128/318, 30/133, 128/276, 128/321, 128/346**

[51] Int. Cl. **B26b 13/22, A61b 17/32**

[58] Field of Search **30/133 X, 41.5; 128/276 X, 128/277.2, 297, 318, 321 X, 354, 346 X, 309; 81/43**

References Cited

UNITED STATES PATENTS

2,082,782 6/1937 Allen 128/321 X

2,601,513	6/1952	Gladstone.....	128/321 X
3,361,133	1/1968	Kimberley et al.	128/346
3,495,593	2/1970	Snyder.....	128/309
3,561,448	2/1971	Peternel.....	128/346
3,606,681	9/1971	Rogers et al.....	128/318 X

OTHER PUBLICATIONS

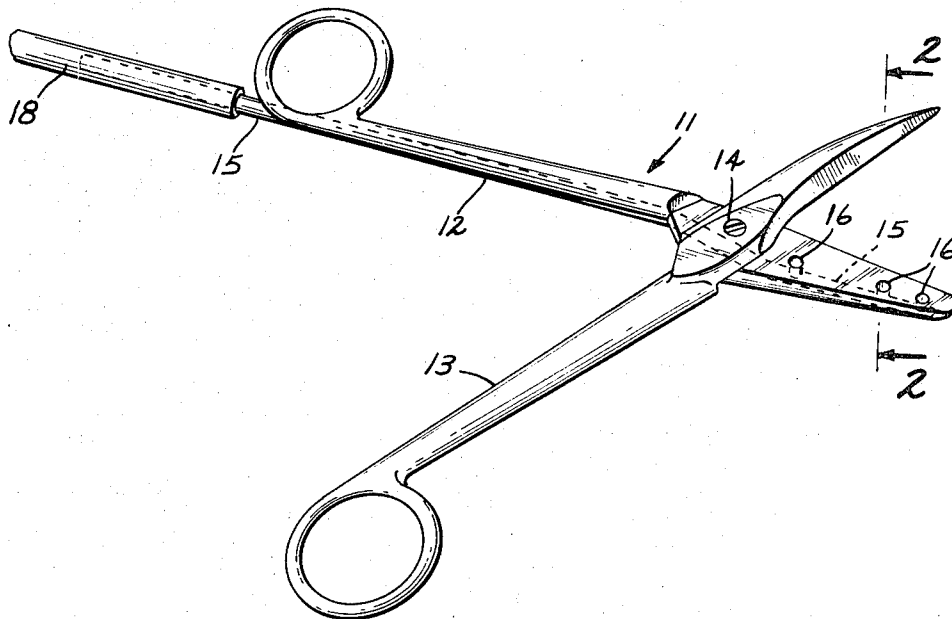
The Lancet, "Common-Bile Duct Forceps", Page 476, Sept. 4, 1965, Vol. II/'65, No. 7410.

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ABSTRACT

A surgical instrument of scissors configuration having one or more suction openings disposed at the functional end thereof, the openings communicating with a suction conduit which is carried by and movable with one or both of the instrument handles or manipulating means.

18 Claims, 9 Drawing Figures



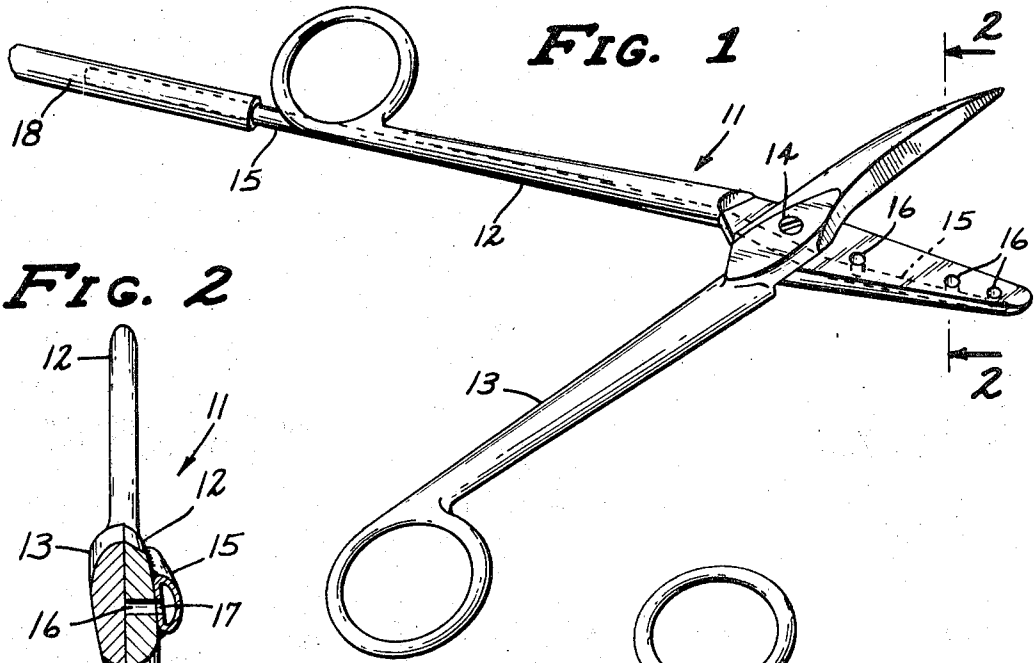


FIG. 2

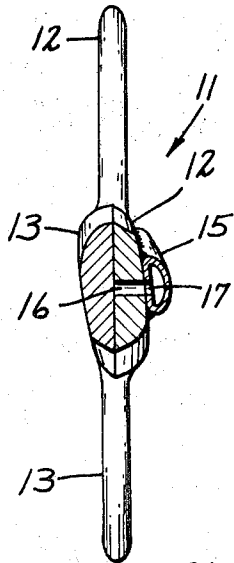


FIG. 3

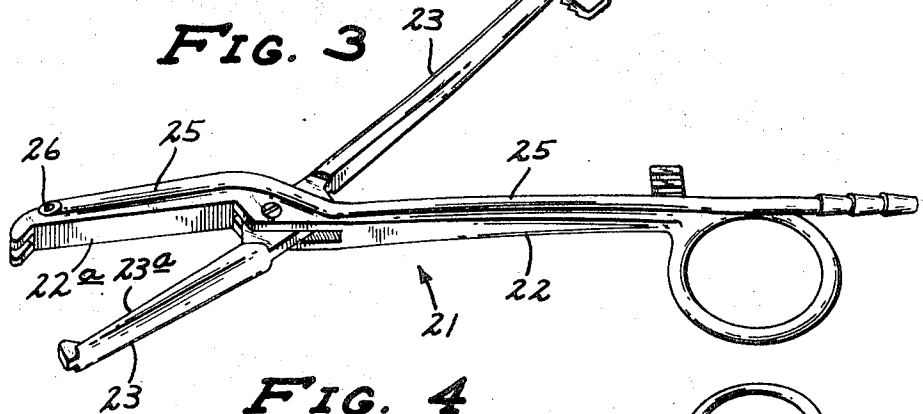


FIG. 4

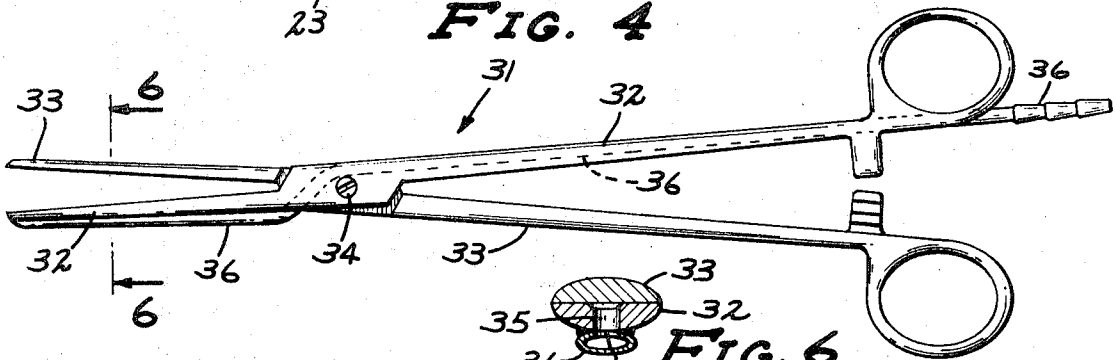


FIG. 5

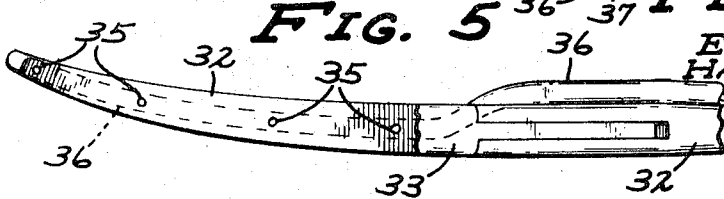
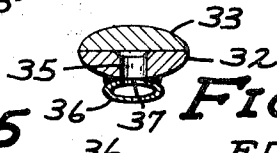


FIG. 6



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FIG. 7

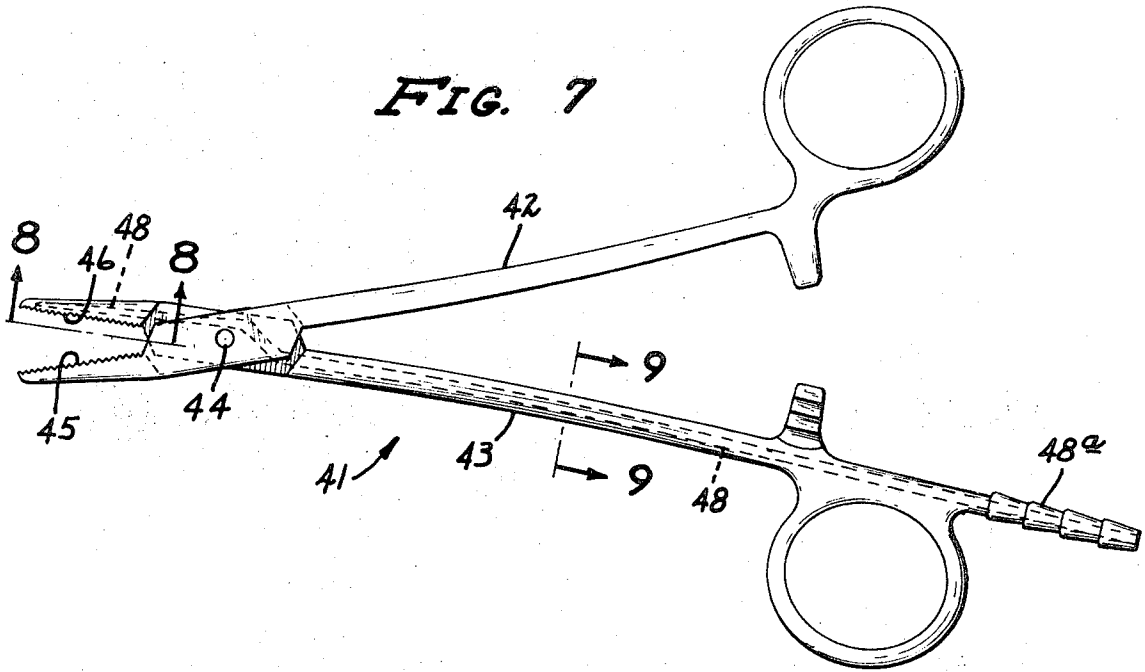


FIG. 8

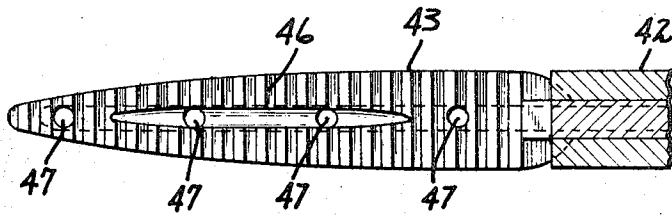
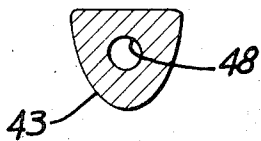


FIG. 9



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INSTRUMENT SURGICAL WITH SUCTION DEVICE

This is a continuation of application Ser. No. 156,825, filed June 25, 1971 and now abandoned.

The invention relates generally to surgical instruments, and is specifically directed to an instrument of generally scissors configuration which includes suction means for removing fluid and/or fumes from a surgical area. As used herein, the term scissors refers to the manipulating action of the instrument rather than the cutting or shearing action of the functional end of the instrument.

A problem encountered in the performance of surgical operations is the removal of blood and other body fluids, and sometimes fumes, from the area in which surgery is undertaken. The presence of such fluids may be the direct result of incision, or there may have been an accumulation prior to entry into the area. Fumes can sometimes be a problem also, such as when a Bovey current is being used. In any such situation, it is ordinarily necessary that such fluids or fumes be removed as quickly as possible to permit the surgeon to carry out his tasks with the least possible obstruction.

One solution to the problem has been the provision of a probe or similar device which is connected to a vacuum source and is capable of aspirating body fluids from the surgical area. However, when the surgeon is using scissors, forceps, or the like in his operative tasks, it is necessary either that the suction device be manipulated by a surgical assistant, which is often impossible due to space limitations; or, that the surgeon change instruments as often as the accumulation of fluid becomes a problem.

Our invention enables the surgeon to perform the normal surgical tasks as well as the suction removal of accumulated fluids from the surgical area simultaneously with a single surgical instrument. The instrument is of scissors configuration and includes one or more aspirating openings at the functional end of the instrument which communicates with a fluid conduit carried by and movable with one or both of the instrument handles or manipulating means. The conduit is connected to a vacuum source, thus permitting the surgeon to effect the removal of body fluids simply by exposing the suction openings to the fluid.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of surgical scissors embodying the inventive principle, the scissors being shown in an open position;

FIG. 2 is a sectional view of the surgical scissors taken along the line 2—2 of FIG. 1, with the scissors in a closed position;

FIG. 3 is a perspective view of a surgical clamp embodying the inventive principle, the clamp being shown in an open position;

FIG. 4 is a top plan of an alternative surgical clamp shown in an open position;

FIG. 5 is an enlarged fragmentary view in elevation of the surgical clamp of FIG. 4; and portions thereof broken away;

FIG. 6 is an enlarged sectional view of the surgical clamp taken along the line 6—6 of FIG. 4, the jaws of which are shown in a closed position;

FIG. 7 is a top plan of a needle holder instrument shown in an open position;

FIG. 8 is an enlarged sectional view taken along the line 8—8 of FIG. 7; and

FIG. 9 is an enlarged sectional view taken along the line 9—9 of FIG. 7.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring initially to FIGS. 1 and 2, a surgical instrument of scissors configuration is represented generally by the numeral 11, and is shown to comprise a pair of elongated members 12, 13, each of which has a blade end and a handle end, sometimes referred to herein as manipulating means. Elongated members 12 and 13 are pivotally connected at an intermediate point by a screw or rivet 14, or other pivotal means, in a manner so that the respective blade or functional ends thereof may coact to perform a surgical cutting or dissecting operation by relative movement of the handle portions. Although FIGS. 1 and 2 show a surgical scissors, the term scissors configuration is often used herein to refer to the general type of pivotally connected instrument rather than any cutting or shearing action performed thereby.

A fluid conduit 15 has one side conforming generally to the shape of elongated member 12, and is affixed to the outer face of member 12 over its length for movement therewith.

The conduit 15 is shown in FIG. 2 to have a flattened cross section, but this is not a necessary feature of the device. It will also be noted that the conduit 15 may be integrally formed within the elongated member 12. Also, it may be desired for some applications to provide conduits for both elongated members 12, 13. A plurality of bores 16 (three are shown in FIG. 1) extend through the blade portion of elongated member 12 from the inner face to the outer face thereof, and communicate with conduit 15 through aligned openings 17 formed therein. In some instruments, it may be desirable to have only one opening on the instrument end portion, and for other instruments it may be desirable to have openings which open on the inner, outer, side or end faces of the instrument.

The opposite end of conduit 15 projects beyond the associated handle portion, as shown in FIG. 1, and is adapted for connection to a vacuum source through a flexible tube 18. For some uses, the conduit 15 may be connected to source of fluid under pressure to be dripped from the openings 17 for washing purposes. The source of vacuum or fluid under pressure is sometimes broadly referred to herein as a source of fluid pressure differential. Also, it may be desirable to provide one of the members 12, 13 with a conduit connected to a vacuum source where the other member has a conduit connected to a fluid pressure source so that the washing fluid may be simultaneously flowed out and removed.

In FIG. 3, a surgical instrument 21 comprises a pair of pivotally connected elongated members 22—23, the functional ends of which are shaped to provide a clamping or forcep-type function. A fluid conduit 25 is affixed to or made part of elongated member 22 over its length, and terminates in one or more openings 26 immediately adjacent the forceps tip or other desired location. The inner faces 22a and 23a of the members 22, 23 are provided with gripping striations, as shown in FIG. 3.

FIGS. 4-6 disclose an alternative clamp 31, which again comprises a pair of elongated members 32, 33 which are pivotally connected at an intermediate point by a screw or rivet 34, or other pivotal means. As best seen in FIG. 5, the functional ends of elongated member 32, 33 are curved to facilitate the clamping, grasping or dissecting function in areas which are difficult to reach, although such ends may obviously be of straight or other configuration.

A plurality of bores 35 are formed in the functional tip of elongated member 32, opening on the inner face thereof in a manner similar to the bores 16 of instrument 12. One or more bores 35 may be suitably located at various positions as noted above in connection with instrument 12. A fluid conduit 36 is also affixed to elongated member 32 for movement therewith, and fluid communication is established with the bores 35 through openings 37 formed therein.

FIGS. 7-9 disclose another embodiment of our invention which comprises a surgical instrument commonly referred to as a needle holder 41. The needle holder 41 is also constructed in a manner referred to herein as a generally scissors configuration, and comprises a pair of elongated members 42, 43 which are pivotally connected at an intermediate location by means of a screw 44 or other pivotal connecting means.

The functional ends of members 42, 43 are provided with serrated or striated inner faces 45, 46 to facilitate firm gripping of a needle, not shown. A plurality of bores 47 are shown opening into the face 46, although only one bore may be desired for some applications or several bores opening at different locations on the instrument end portion may be desired in still other instrument designs. A fluid conduit 48 is formed within the member 43, as best shown in FIG. 9 and is arranged to provide fluid communication with the bores 47. Although this location of the fluid conduit is shown in association with the needle holder, the same fluid conduit location could be used in the other instrument as well. The projecting end portion 48a of conduit 48 is adapted to permit connection with a vacuum source, as noted above, to provide for the removal of blood and other fluids.

It will be appreciated from the foregoing that each of the respective devices 11, 21 and 31 are capable of removing body fluids or fumes and the like from a surgical area in addition to an incision, clamping, dissecting or other useful surgical functions by simple exposure of suction openings to such fluids, fumes or gases. Thus, the surgeon is capable of keeping the surgical area continuously clean without help or hindrance from an assistant and without changing instruments. This helps to remove the hindrance of additional hands in the surgical field and also permits the use of a freed hand for other purposes. We claim:

1. A surgical instrument of scissors-type configuration comprising:

- a. first and second elongated members of essentially the same length, each having a manipulating end and a functional end, said functional ends having opposed inner faces and outer faces, said inner faces being substantially adjacent each other in the closed position the first and second elongated members being pivotally connected at an intermediate point disposed nearer the distal end of the functional ends than the distal end of said manipu-

lating ends, and arranged so that the functional ends together provide a surgical function upon relative movement of said manipulating ends;

- b. fluid conduit means associated with at least one of said first and second elongated members, the conduit means terminating in a plurality of fluid openings disposed along the inner face of said one elongated member and distributed between a point proximate said pivotal connection and said distal end of the functional end of said one elongated member;

c. the conduit means being adapted for connection to a source of fluid pressure differential.

2. The surgical instrument defined by claim 1, wherein the plurality of fluid openings are arranged in a line extending from said pivotal connection to the extreme functional end of said one elongated member.

3. The surgical instrument defined by claim 1, wherein the functional ends of the first and second elongated members comprise blades constructed and arranged to perform a shearing, incising, dissecting or cutting function.

4. The surgical instrument defined by claim 1, wherein the functional ends of the first and second elongated members comprise clamping members constructed and arranged to perform a forceps-type or clamping function.

5. The surgical instrument defined by claim 1, wherein the functional ends of the elongated members comprise gripping portions constructed and arranged to perform a needle holding function.

6. The surgical instrument defined by claim 1, wherein the fluid conduit means is formed integrally within the elongated member.

7. The surgical instrument defined by claim 1, and further comprising:

- a. second fluid conduit means associated with the other of said first and second elongated members, the second conduit means terminating in a plurality of fluid openings disposed on the inner face of said other elongated member and distributed between a point proximate said pivotal connection and the extreme functional end of said other elongated member;

b. said second fluid conduit means being adapted for connection to a source of fluid pressure differential.

8. A surgical instrument of scissors-type configuration, comprising:

- a. first and second elongated members of essentially the same length, each having a manipulating end and a functional end, said functional ends having opposed inner faces and outer faces, said inner faces being substantially adjacent each other in the closed position the first and second elongated members being pivotally connected at an intermediate point and arranged so that the functional ends together provide a surgical function upon relative movement of said manipulating ends;

b. fluid conduit means associated with at least one of said first and second elongated members, the conduit means terminating in a plurality of fluid openings disposed along the inner face of said one elongated member and along a line extending between said pivotal connection and the extreme functional end of said one elongated member;

c. the conduit means being adapted for connection with a source of fluid pressure differential.

9. The surgical instrument defined by claim 8, wherein the conduit means comprises a passageway formed within at least a portion of said one elongated member, and a fluid connector member affixed to said one elongated member and communicating with the passageway, said connector member being adapted for connection to the source of fluid pressure differential.

10. The surgical instrument defined by claim 8, wherein the functional ends of the first and second elongated members comprise blades constructed and arranged to perform a shearing, incising, dissecting or cutting function.

11. The surgical instrument defined by claim 8, wherein the functional ends of the first and second elongated members comprise clamping members constructed and arranged to perform a forceps-type or clamping function.

12. The surgical instrument defined by claim 8, wherein the functional ends of the elongated members comprise gripping portions constructed and arranged to perform a needle holding function.

13. The surgical instrument defined by claim 8, wherein the point at which the first and second elongated members are pivotally connected is disposed nearer said functional ends than said manipulating ends.

14. The surgical instrument defined by claim 8, and further comprising:

- a. second fluid conduit means associated with the other of said first and second elongated members, the conduit means terminating in a plurality of fluid openings disposed on the inner face of said other elongated member and along a line extending between said pivotal connection and the extreme functional end of said other elongated member;
- b. the second fluid conduit means being adapted for

connection with a source of fluid pressure differential.

15. A surgical instrument of scissors type configuration, comprising:

- a. first and second elongated members of essentially the same length, each having a manipulating end and a functional end, said functional ends having opposed inner faces and outer faces, the first and second elongated members being pivotally connected at an intermediate point and arranged so that the functional ends together provide a surgical function upon relative movement of said manipulating ends;
- b. a plurality of bore-like passages opening on and spaced along the inner face of one of said first and second elongated members and extending entirely therethrough to the outer face thereof;
- c. and fluid conduit means associated with said one elongated member and secured at least in part to the outer face thereof;
- d. said fluid conduit means having opening means formed therein registering with said plurality of bore-like passages for fluid communication therewith, and being adapted for connection with a source of fluid pressure differential.

16. The surgical instrument defined by claim 15, wherein the functional ends of the first and second elongated members comprise blades constructed and arranged to perform a shearing, incising, dissecting or cutting function.

17. The surgical instrument defined by claim 15, wherein the functional ends of the first and second elongated members comprise clamping members constructed and arranged to perform a forceps-type clamping function.

18. The surgical instrument defined by claim 15, wherein the fluid conduit means conforms in shape to the outer face of said one elongated member.

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